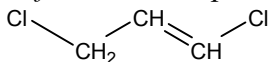


## 1,3-DICHLOROPROPENE (TECHNICAL GRADE)

CAS No. 542-75-6

First Listed in the *Fifth Annual Report on Carcinogens*



### CARCINOGENICITY

Technical-grade 1,3-dichloropropene, containing 1.0% epichlorohydrin as a stabilizer (trade name of the material purchased for testing was Telone II<sup>®</sup>), is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (NTP 269, 1985; IARC V.41, 1986; IARC S.7, 1987). When administered by gavage, Telone II<sup>®</sup> increased incidences of squamous cell papillomas and carcinomas of the forestomach and neoplastic nodules of the liver in male rats and squamous cell papillomas of the forestomach in female rats. When administered by gavage, Telone II<sup>®</sup> increased the incidences of transitional cell carcinomas of the urinary bladder, alveolar/bronchiolar adenomas of the lung, and squamous cell papillomas or carcinomas of the forestomach in female mice. Evidence for carcinogenicity in male mice receiving Telone II<sup>®</sup> by gavage was considered to be inadequate because of reduced survival in the vehicle control group. However, there was some indication that Telone II<sup>®</sup> increased the incidences of transitional cell carcinomas of the urinary bladder, squamous cell papillomas of the forestomach, and alveolar/bronchiolar adenomas and carcinomas of the lung in male mice (NTP 269, 1985). When administered by subcutaneous injection, the *cis* isomer of 1,3-dichloropropene induced injection-site fibrosarcomas in male mice (Van Duuren et al., 1979; IARC S.7, 1987).

There are no adequate data available to evaluate the carcinogenicity of 1,3-dichloropropene in humans. Two cases of malignant histiocytic lymphoma were reported among nine firemen accidentally exposed to 1,3-dichloropropene six years before diagnosis. Because firemen are exposed to a large number of chemicals, the role of 1,3-dichloropropene cannot be evaluated (IARC S.7, 1987).

### PROPERTIES

1,3-Dichloropropene is a clear, white-to-light, straw-colored liquid with a penetrating, irritating, chloroform-like odor. It is relatively insoluble in water and is soluble in ether, acetone, toluene, and benzene. 1,3-Dichloropropene is flammable, and when heated to decomposition it produces toxic fumes of hydrochloric acid and other chlorinated compounds as well as irritating gases. It reacts readily with aluminum, magnesium, and alloys of these metals.

Telone II<sup>®</sup> was originally marketed as a mixture of technical-grade 1,3-dichloropropene isomers (89%-92%) with small amounts of 1,2-dichloropropane, trichloropropane, and epichlorohydrin. As currently marketed, Telone II<sup>®</sup> is approximately 98% 1,3-dichloropropene with traces of 1,2-dichloropropane, and epoxidized soybean oil added as a stabilizer. Other trade names for technical-grade 1,3-dichloropropene products are D-D92, Dorlone II, Nematox II, and Dedisol C.

## USE

1,3-Dichloropropene (technical grade) is used as an intermediate in the manufacture of 3,3-dichloro-1-propene and other pesticides. Telone II<sup>®</sup> is a widely used agricultural soil fumigant for parasitic nematodes (NTP 269, 1985; SRIC, 1983). Telone II<sup>®</sup> is used in Hawaii to control nematodes on pineapples (Albrecht, 1987).

## PRODUCTION

Current production volumes for 1,3-dichloropropene were not found. The 1998 *Chemical Buyers Directory* lists one U.S. supplier of 1,3-dichloropropene (Tilton, 1997). The USITC identified only one producer of the compound, with no stated production volume, from 1986-1994 (USITC, 1987-1991, 1993-1995). According to the 1997 Directory of Chemical Producers, currently there is still only one producer (SRIC, 1997). The EPA (OPPT) High Production Volume Chemicals list gives a production volume range of 3.0 to 5.0 million lb (USEPA, 1997). In 1985, the only domestic manufacturer of Telone II<sup>®</sup> produced an estimated 52 million lb (NTP 269, 1985). U.S. imports constituted approximately 7% of production in 1985 and approximately 9% of production in 1984. In 1982, an estimated 25 million lb of Telone II<sup>®</sup> were produced in the United States (NTP 269, 1985). The 1979 TSCA Inventory reported that eight manufacturers produced between 11 and 60 million lb of Telone II<sup>®</sup> in 1977 (TSCA, 1979). No export data on Telone II<sup>®</sup> were available. Telone II<sup>®</sup> is the only technical-grade 1,3-dichloropropene product available in the United States.

## EXPOSURE

The primary routes of potential human exposure to 1,3-dichloropropene are inhalation of vapors, dermal contact, and ingestion of contaminated foods and drinking water (NTP 269, 1985; Gosselin et al., 1984; ATSDR, 1992-R045). Although data pertaining to its occurrence in foods and water are limited, the presence of 1,3-dichloropropene in various water samples indicates its formation via chlorination of water (ATSDR, 1992-R045). Potential consumer exposure to 1,3-dichloropropene residues may occur through ingestion of pineapples fumigated with Telone II<sup>®</sup>. An estimate based on the usual application rate for Telone II<sup>®</sup> would indicate that nearly 2 million lb of the fumigant were used on pineapple fields in Hawaii in 1985 (Albrecht, 1987). Workers may be exposed to 1,3-dichloropropene and its residues during the formulation and application of Telone II<sup>®</sup>. Additionally, workers in the pineapple production industry may be exposed during field preparation, planting, field maintenance, and crop harvesting (Albrecht, 1987). The National Occupational Exposure Survey (1980-1983) indicated that 1,779 workers, including 33 women, were potentially exposed to 1,3-dichloropropene (NIOSH, 1984). This estimate was based on observations of the actual use of the compound (89%) and the use of tradename products known to contain the compound (11%). The ACGIH has established a threshold limit value of 1 ppm (5 mg/m<sup>3</sup>) as an 8-hr time-weighted average (TWA) in air and a short-term exposure limit (STEL) of 10 ppm (50 mg/m<sup>3</sup>) (ACGIHb, 1980). The Toxic Chemical Release Inventory (EPA) listed eight industrial facilities that produced, processed or otherwise used 1,3-dichloropropene in 1988 (TRI, 1990). In compliance with the Community Right-to-Know Program, the facilities reported releases of 1,3-dichloropropene to the environment which were estimated to total 58,000 lb.

## **REGULATIONS**

1,3-Dichloropropene is regulated by EPA under the Clean Water Act (CWA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), Resource Conservation and Recovery Act (RCRA), and Superfund Amendments and Reauthorization Act (SARA). A reportable quantity (RQ) of 100 lb has been established for 1,3-dichloropropene under CERCLA and CWA. It is a hazardous substance regulated under RCRA's hazardous waste disposal rule and is subject to reporting requirements under SARA. Registration standards for Telone<sup>®</sup> have been developed under FIFRA. OSHA has set a PEL for 1,3-dichloropropene and prohibits skin contact. OSHA also regulates the compound under the Hazard Communication Standard and as a chemical hazard in laboratories. Regulations are summarized in Volume II, Table B-43.